CLAIM AMENDMENTS

Please amend the claims as described below. In accordance with 37 CFR §1.121, a complete listing of all claims in the application is provided below. Notably, the status of each claim is indicated in the parenthetical expression adjacent to the claim number.

Claims 1 - 25 (**canceled**).

26. (**NEW**): A method of testing a semiconductor wafer having first and second areas, wherein the first and second areas each include a contact hole pattern having at least one contact hole, the method comprising:

irradiating the contact hole pattern of the first area of the semiconductor wafer with an electron beam;

measuring a first current at a back surface of the semiconductor wafer wherein the first current is generated in response to the electron beam irradiated on the contact hole pattern of the first area;

irradiating the contact hole pattern of the second area of the semiconductor wafer with an electron beam;

measuring a second current at the back surface of the semiconductor wafer wherein the second current is generated in response to the electron beam irradiated on the contact hole pattern of the second area; and

comparing the first current to the second current to detect a difference.

27. (**NEW**): The method of claim 26 wherein irradiating the contact hole pattern of the first area of the semiconductor wafer with an electron beam includes irradiating the

contact hole pattern of the first area by scanning the electron beam across the contact hole pattern of the first area.

28. (**NEW**): The method of claim 26 wherein the electron beam includes a width that is substantially equal to the width of the contact hole.

29. (**NEW**): The method of claim 26 wherein the electron beam includes a width that is greater than the width of the contact hole.

30. (**NEW**): The method of claim 26 wherein the electron beam includes a width that is greater than a plurality of contact holes.

31. (**NEW**): The method of claim 26 wherein the electron beam includes a circular cross-section.

32. (**NEW**): The method of claim 26 wherein the electron beam includes a circular cross-section and a diameter that is greater than a plurality of contact holes.

33. (**NEW**): The method of claim 26 wherein the electron beam includes an ellipsoidal or square cross-section and a width that is greater than a plurality of contact holes.

34. (**NEW**): The method of claim 26 further including:

comparing the difference to a predetermined value; and

detecting a defect in at least one of the contact hole pattern of the first area of the semiconductor wafer or the contact hole pattern of the second area of the semiconductor wafer when the difference is greater than the predetermined value.

35. (**NEW**): The method of claim 34 wherein measuring the first current at the back surface of the semiconductor wafer includes measuring the magnitude and polarity of the current.

36. (**NEW**): The method of claim 34 further including determining the predetermined value by:

irradiating the contact hole pattern of an area of a second semiconductor wafer with an electron beam wherein the contact hole pattern of the area of the second semiconductor wafer includes normal contact holes; and

measuring a current at a back surface of the second semiconductor wafer wherein the current is generated in response to the electron beam irradiated on the contact hole pattern of the second area of the second semiconductor wafer.

37. (**NEW**): The method of claim 34 further including storing the location of the contact hole pattern of the first area of the semiconductor wafer in response to detecting the defect.

38. (**NEW**): The method of claim 26 wherein the current measured for the contact hole pattern of the first area of the semiconductor wafer includes a waveform that is representative of the current measured when the electron beam is sequentially irradiated on a plurality of different locations corresponding to the contact hole pattern of the first area of the semiconductor wafer.

39. (**NEW**): The method of claim 26 wherein the current measured for the contact hole pattern of the first area of the semiconductor wafer is a value.

40. (**NEW**): A method of testing a semiconductor wafer having a first region and a second region, wherein the first and second regions each include a plurality of contact holes arranged in the same pattern, the method comprising:

irradiating the plurality of contact holes of the first region of the semiconductor wafer with an electron beam;

measuring a first current at a back surface of the wafer wherein the first current is generated in response to the electron beam irradiated on the plurality of contact holes of the first region of the semiconductor wafer;

irradiating the plurality of contact holes of the second region of the semiconductor wafer with an electron beam;

measuring a second current at the back surface of the wafer wherein the second current is generated in response to the electron beam irradiated on the plurality of contact holes of the second region of the semiconductor wafer; and

detecting a difference between the plurality of contact holes of the first region and the plurality of contact holes of the second region using the first current and the second current.

41. (**NEW**): The method of claim 40 wherein irradiating the plurality of contact holes of the first region of the semiconductor wafer with an electron beam includes scanning the electron beam across the plurality of contact holes of the first region of the semiconductor wafer.

42. (**NEW**): The method of claim 40 wherein the electron beam includes a width that is substantially equal to the width of at least one contact hole of the plurality of contact holes.

43. (**NEW**): The method of claim 40 wherein the electron beam includes a width that is greater than the width of the contact holes of the plurality of contact holes.

44. (**NEW**): The method of claim 40 wherein the electron beam includes a width that is greater than all of the contact holes of the plurality of contact holes.

45. (**NEW**): The method of claim 40 wherein the electron beam includes a circular cross-section.

46. (**NEW**): The method of claim 40 wherein the electron beam includes a circular cross-section and a diameter that is greater than all of the contact holes of the plurality of contact holes.

47. (**NEW**): The method of claim 40 wherein the electron beam includes an ellipsoidal or square cross-section and a width that is greater than all of the contact holes of the plurality of contact holes.

48. (**NEW**): The method of claim 40 measuring a first current at the back surface of the semiconductor wafer includes measuring the magnitude and polarity of the current.

49. (**NEW**): The method of claim 40 wherein the current measured for the plurality of contact holes of the first region of the semiconductor wafer is a waveform that is representative of the current measured when the electron beam is sequentially irradiated on a plurality of different locations corresponding to the pattern of the first region of the semiconductor wafer.

50. (**NEW**): The method of claim 40 wherein the current measured for the plurality of contact holes of the first region of the semiconductor wafer is a value.

51. (**NEW**): The method of claim 40 wherein detecting a difference in the plurality of contact holes of the first and second regions of the semiconductor wafer includes:

calculating a current value per unit area of the plurality of contact holes of the first region using the first current;

calculating a current value per unit area of the plurality of contact holes of the second region using the second current; and

wherein detecting a difference in the plurality of contact holes of the first and second regions of the semiconductor wafer includes comparing the current value per unit area of the plurality of contact holes of the first region to the current value per unit area of the plurality of contact holes of the second region to detect a difference.

52. (**NEW**): An apparatus to test semiconductor devices, disposed on or in a semiconductor wafer, including first and second devices that each include a pattern having a plurality of contact holes, the apparatus comprising:

an electron beam source, adapted to sequentially irradiate an electron beam on the patterns of the first and second semiconductor devices;

a stage, adapted to receive the semiconductor wafer and position the wafer relative to the electron beam source such that in a first position the electron beam source irradiates the pattern of the first semiconductor device and in a second position the electron beam source irradiates the pattern of the second semiconductor device;

a current measuring device, adapted to measure a current at a back surface of the wafer that is generated in response to the electron beam, wherein the current measuring device measures the current at the back surface of the wafer when the electron beam source irradiates the pattern of the first semiconductor device and when the electron beam source irradiates the pattern of the second semiconductor device;

a defect detection device to detect a defect in one of the patterns of the first and second semiconductor devices using the current measured when the electron beam source irradiates the pattern of the first semiconductor device and the current measured when the electron beam source irradiates the pattern of the second semiconductor device.

53. (**NEW**): The apparatus of claim 52 wherein the current measuring device includes an electrode electrically connected to the back surface of the semiconductor wafer to measure a current at the back surface of the wafer that is generated in response to the electron beam.

54. (**NEW**): The apparatus of claim 52 further including a current comparator device to compare the current measured when the electron beam source irradiates the pattern of the first semiconductor device and the current measured when the electron beam source irradiates the pattern of the second semiconductor device.

55. (**NEW**): The apparatus of claim 52 further including a current comparator device, coupled to the current measuring device and the defect detection device, to detect a difference between the current measured when the electron beam source irradiates the pattern of the first semiconductor device and the current measured when the electron beam source irradiates the pattern of the second semiconductor device.

56. (**NEW**): The apparatus of claim 52 wherein the electron beam includes a width that is substantially equal to the width of the contact holes.

57. (**NEW**): The apparatus of claim 52 wherein the electron beam includes a width that is greater than the width of the contact holes.

58. (**NEW**): The apparatus of claim 52 wherein the electron beam includes a width that is greater than a plurality of contact holes.

59. (**NEW**): The apparatus of claim 52 wherein the electron beam includes a circular cross-section.

60. (**NEW**): The apparatus of claim 52 wherein the electron beam includes a circular cross-section and a diameter that is greater than a plurality of contact holes.

61. (**NEW**): The apparatus of claim 52 wherein the electron beam includes an ellipsoidal or square cross-section and a width that is greater than a plurality of contact holes.

62. (**NEW**): The apparatus of claim 52 wherein current measuring device is adapted to measure a magnitude and a polarity of the current at the back surface of the wafer that is generated in response to the electron beam.